

THE PROBLEMS, ACHIEVEMENTS AND TRENDS IN WASTE MANAGEMENT IN THE REPUBLIC OF MOLDOVA

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Key words: waste, management, ramps, efficiency, regional development.

Abstract. The main problems of waste management in the Republic of Moldova are: 1) spontaneous and illegal dumps; 2) overload the landfill in some localities and their modest use in others; 3) most ramps do not meet sanitary-hygienic and ecological security; 4) deplorable condition and even lack of paved or asphalted access roads to the landfill; 5) inadequate treatment of organic sludge from wastewater treatment plants; 6) animal wastes from household; 7) low efficiency of public services of waste management. In recent years, there was a significant reduction in unauthorized landfills and promoting the concept of integrated waste management. A national network of waste management is being developed, which will include inter-municipal and interregional polygons storage, sorting and transfer stations and waste incineration plants.

Introduction

For Moldova and similar other countries with low financial insurance and inefficient institutional structures, the biggest problem is not very large stocks of waste, but their chaotic and unlawful location. Most landfills do not meet approved environmental and sanitary-hygienic conditions, lack of dam embankments, platforms designed, protective fence, guard service, tracking and monitoring of waste stored. Failure of drainage works necessary to substantially reduce the landfill of municipal waste management efficiency increases the risk of soil and water pollution. A critical ecological situation is found in overloaded landfill solid waste disposal in Orhei, Comrat, Edinet, Balti, Hincesti and Rezina towns. Also, most localities do not apply to integrate waste management and collection and disposal activities to carry their unplanned and chaotic character.

1. The problem of spontaneous and illegal dumps

Annually are found around 3000 illegal dumps, only large and medium-sized, the small ones being practically very numerous. Most of these dumps are located on the banks of ravines and small rivers and near wells and springs. Although in recent years have been eliminated about 70% of the illegal dumps, they reappear in

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most communities. This critical situation is subject to minor punishment of these activities, the careless attitude of the population and local administration, insufficient human resources, technical and economic studies to prevent and resolve this problem. Endless piles of trash not only affect the environment and public health in this area, but also transform our villages and blooming gardens in fields and huge holes of waste.

In 2009, the maximum number of identified illegal dumps is registered in Chişinău (213), in ATU Găgăuzia (122), in Căuşeni (180), Ştefan-Vodă (101), Cahul (116) Leova (102) Hânceşti (130), Orhei (103) Rezina (109) and Briceni (130) districts. The minimum share of the liquidated dumps is found in districts of Râşcani (13%), Leova (13%), Anenii Noi (23%), Edineţ (35%), Cimişlia (35%) and Hânceşti (36%) [1]. The number of dumps discovered and liquidated depends not only on the size of settlements, technical assistance and financial effectiveness of sanitation, but also on the frequency, area and efficiency of evidence and monitoring measures of these dumps. In the combat with illegal dumps is advisable to extend the construction of platforms for the collection of waste, including animal waste and the recycling and adequate application of the provisions of the new Code in this field [2].

2. Status of waste landfill

Due to overloaded landfills, but also to increase consumption, area and volume of communal ramps is registered a slight increase in most administrative-territorial units. The total area of the communal ramps is approximately 1400 ha and their number is 1864. About 40% of the area and number of municipal landfills are unauthorized. As a result of persistent efforts of the environmental authorities, the area of unauthorized ramps has decreased from 686 ha in 2004 to 434 in 2009. In the percentage ratio, this decrease is even more evident - from 61% in 2001 to only 31% in 2009 (Figure 1). The total number of unauthorized ramps also recorded a downward trend from 1356 in 2001 to just 854 in 2009 and their share - from 73% to 46%. A significant reduction is found in the districts Drochia, Glodeni Sângerei and Basarabeasca. The maximum number of unauthorized ramps occurred in the districts Soroca (93), Râşcani (75), Rezina (59), Sângerei (41), Anenii Noi and their maximum share (80%) is registered in the Bălţi and Chişinău towns, and in the districts Străşeni, Dubăsari, Edineţ and Stefan Voda Causeni. Minimum share (less than 10%) is attested in Donduşeni and Călăraşi districts (Figure. 2).

Despite reducing the number and surface of unauthorized ramps, the municipal waste management situation is tense, and in many localities even critical. In most cases, the licensing procedure has a formal character and the majority approved ramps, do not correspond, to a large extent, to the requirements for construction, environmental protection and human health. According to the

number of existing municipal landfills, in particular, unauthorized and illegal dumps, the most critical situation is registered in the districts Râșcani, Soroca, Briceni, Edineț, Rezina, Șoldănești, Anenii Noi, Hâncești, Căușeni, Ștefan-Vodă, Cantemir and ATU Găgăuzia. These districts should be considered priority to financing of sanitation projects.

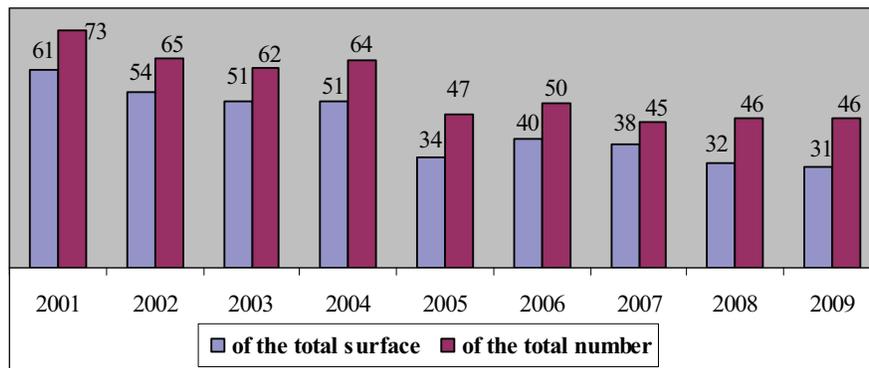


Fig. 1 - The share of unauthorized ramps

Compared with the developing states with similar low financial situation, in Moldova we do not find a shortage of waste ramps, but even an excess. During Soviet times were built one or several platforms in most of the localities. In the '90s, for lack of financial sources, the state of many landfills has declined, and their impact on the environment has increased considerably. Many of the communal landfills have no paved roads, which is why the unfavourable periods (rainy) are not accessible for waste disposal. As a result of inefficient regional policies of waste ramps managing, they are over-capacitated in some localities (particularly in the proximity of large urban centres') and a very modest use of ramps is found in other localities, including those that were built or rebuilt in the last decade with substantial financial contributions from the environmental funds [4] and other institutions providing such assistance. This situation, along with the problem of illegal dumps, requires selecting, construction and modernization of inter-communal and interregional ramps, which would correspond to economic and ecological criteria, would provide optimal transport accessibility and avoid impacts on protected areas, ponds and water courses, on sources of drinking water. Also, very important are the platforms and equipment that provide pre-collection, including sampling, waste disposal equipment, the attitude of the population and local authorities. Compared to the landfill, these are much weaker links, which make less efficient household waste management [2].

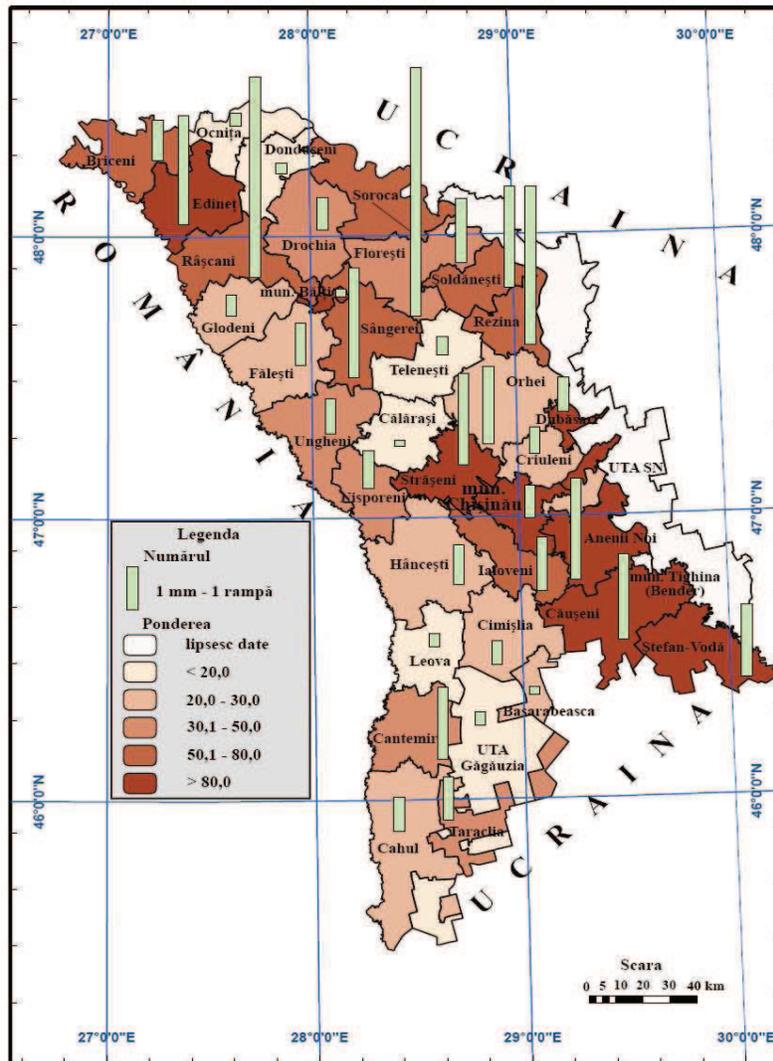


Fig. 2 - The number and share of unauthorized ramps [1], [3].

With the destruction of big zoo-technical enterprises, livestock has increased considerably in rural inside and in small towns, which increases the level of contamination of adjacent wells and small rivers, directly affecting public health.

Thus were constructed communal and individual platforms for livestock manure storage in ATU Găgăuzia, in the districts Taraclia, Călărași, Drochia, Anenii Noi, Leova, Hâncești, Dondușeni, Fălești, Ungheni and Căușeni [5].

3. Insufficient treatment of organic sludge from sewage

Processed organic sludge and solids collected at wastewater treatment plants are transported on fields, which often are not arranged according to environmental and health normative. Because direct contact with the natural environment, are heavily polluted the atmosphere, groundwater and surface waters in adjacent area. Very severe is the problem of overloading those polygons. In 2003, the Danish Government, through the firm COWI has carried out studies to reduce methane emissions from the accumulated sludge from biological treatment plants of Chișinău and Bălți municipalities, but due to lack of local funds required for co-financing, this project has been cancelled. In February 2010, for dewatering sludge using geo-tubes from the National Environmental Fund have been allocated 4 million MDL. As a result, in late July 2010, work was successfully finished [4].

4. Problems and achievements in promoting integrated waste management

Household waste management is not usually based on the principles of integrated waste management and local strategy in this area and has an unplanned and chaotic character. Evidence, accounting and monitoring of municipal waste management operations, including recyclables is shallow, and tax evasion is an ordinary phenomena. With few exceptions, sanitation services are provided by municipal enterprises, which suffer from severe financial and technical resources and have large debts to public budget.

In recent years, a priority financing direction of environmental funds became sanitation of localities and waste collection. The majority of allocations were for sanitation of localities, especially for construction and modernization of municipal ramps, for liquidation of dumps and unauthorized landfills, to purchase containers, tractors and trucks for waste collection and transportation. A small number of projects are funded for implementation of integrated waste management, for their separate collection, for recovery of animal waste and organic sludge from wastewater treatment plants. Most of these projects are not focused on integrated waste management, designed separately for one of the operations of collection, transport or storage. They also do not take into account economic efficiency and sustainability of these projects. Typically, coverage of these projects did not exceed the limits of a rural locality.

Despite the presence of an inefficient management of waste in most localities of the republic, we can mention a few positive examples, the most obvious of

which would be the mixed enterprise “AVE Ungheni SRL”, founded in late 2008 by the municipal sanitation company of Ungheni (40 %) and the Austrian energetic firm “AVE”. This company provides an integrated waste management, including separate collection, waste disposal at the landfill, turning organic waste (leaves, branches) and export of recyclable waste in the EU and China. Furthermore, AVE Ungheni already provides collection and disposal services in the towns of Durllesti, Stășeni and Anenii Noi, in the village Zgărdești (a suburb of Ungheni). Also, the firm negotiates waste disposal with Cement Company Rezina, particularly those with high caloric return, for their incineration in the existing plant's thermal power plant. In the view of AVE Ungheni, this method requires much lower cost and more efficient, compared to building of new incineration factory. In this respect, we believe that the opinion of a company that worked with success for several decades in the central European states must not be ignored, but carefully examined.

In recent years we witness the implementation of successful, complex projects in the districts Leova, Sângerei, Șoldănești and Dubasarii. In Leova is implemented the project “Developing the concept of waste management in order to lessen the negative consequences on water quality in the district Leova”; achieved in 2007-2009, in partnership for development between the Czech Republic and Moldova. As a result, were constructed and arranged 40 platforms to collect waste, including animal waste and separate collection of recyclable waste, have been purchased containers and means of transportation, modernized urban ramp etc. At the same time, the arranged ramp is used at low capacity, and because of very low purchase prices of recyclable waste, separate collection has a minimum efficiency. As a result of the implementation of the project “Modernization of service sanitation in the town of Șoldănești”, were built 311 platforms for the collection of household waste and equipped four existing platforms, built 4 ECO-houses for selective waste collection, purchased and installed 100 polls for garbage storage, arranged municipal polygon of solid waste. At the present is expected the extension of these work in zonal projects.

Lately have been approved regional projects for integrated waste management in the districts Soroca, Florești, Râșcani, Orhei, Telenești, Nisporeni, Hâncești and in the 8 districts of the South Region (pilot projects). It is necessary that these projects would not only follow effective sanitation and integrated management of waste in every area, and strengthen mutually and permanently relationships with enterprises of purchasing and processing of recyclable waste [2].

5. Trends in waste management optimization

According to the Regional Development Strategies [6-8] have been selected the placements of interregional waste polygons, for zonal transfer stations and waste incineration plants. In the selection of interregional ramps locations has been

taken into account the natural and technical conditions, the avoiding of the impact on groundwater and river system and the positioning in relation to protected natural areas. However, are poorly reflected the transport accessibility, the configuration of road network and its status (particularly in the South Region) [8], the number and surface of excess landfills and illegal dumps in certain areas, proximity to urban centers as major areas of waste stokes generating. The extensive area of waste collection will substantially affect the organization and execution of these activities. It is necessary to give priority not only to spatial aspects, to the location of the respective ramps, but also to organizational aspects, to municipalities that have developed programs and projects for integrated waste management, for the selective pre-collection, management ramps up the delivery and use of recyclable materials.

In developing of the projects proposed to Regional Development Agencies, emphasis was put on inter-municipal landfills and integrated waste management systems, which will include settlements within a river section and will involve joint financial contributions from beneficiary communities. Also, the restrictions imposed by the Public Finance Law and Local Government Law, substantially limit the implementation of projects and regional associations, such as integrated management of waste or construction and operation of transfer stations and inter-municipal or interregional waste polygons. Also, it is necessary to approve the legal provisions which would require waste generators to sign contracts with sanitation and waste disposal enterprises.

Waste sorting at **transfer stations** is more efficient for rural areas and the sector of individual houses in urban centers, where selective pre-collection is quite difficulty and costly. Also, they will contribute to the establishing of functional and mutual relations between components of integrated waste management system, the optimization of the network for collecting and processing municipal waste. The main constraints to promote transfer stations are: 1) waste collection services cover a small area and the amount necessary for the proper operation of waste transfer stations is insufficient; 2) it is very difficult to obtain “economies of scale”; 3) lack of a clear national strategy for the collection and processing network of municipal waste and the location of their components; 4) local budgets are not usually sufficient sources for co-financing the construction and operation of these objects.

Given the stipulations of the Regional Development Strategies, the economic efficiency criteria, the potential environmental and health risks, the location of major areas of waste generation, it is recommended the construction of two incineration plants, in proximity of Chişinău and Bălţi municipalities [6], [7] . They will work especially on the waste collected in the region the plant will be located. If necessary, they can use waste from other parts of the country or outside it (whether will be made these legislative changes). A second option would be the

construction of a single plants with high capacity (over 1000 tons per day), located near the capital, and the third – the construction of a plant above-average capacity in the proximity of the capital and other two lower capacity plants (about 100 tons per day), located near towns of Drochia and Cimișlia, which have already taken steps in this regard. However, the budget of these regional centers is available to co-finance the construction of those plants, and because of failure to "economies of scale", attracting investments for construction of low-capacity plants is unlikely.

At present, there are two such companies in design stage: 1) in the district Sângerei, at a cost of 134 million lei, for Balti and Northern Region; 2) in Chisinau, in proximity to the water treatment plant. Following the public auction of 25 January 2006 was selected the Italian company STR Engineering Consulting, who undertakes to execute the design and construction works of the plant up to 30 months after the cession of the terrain (March 2010) and later to operate the incineration plant for 30 years. The contract value is 190 million EUR. The necessary approvals have been obtained and were allocated 10 hectares of land near the municipal wastewater treatment plant. At the same time were observed some serious gaps: 1) the public partner hasn't developed a feasibility study and specifications; 2) the private investor has a duplicitous reputation, didn't provide the necessary bank guarantee, but may assign his rights and obligations to third parties; 3) the contract contains no compartments on sanctions; 4) negative reaction from environmental and social organizations; 5) the current environmental legislation imposes significant restrictions on the operation of these plants and prohibits the imports of wastes, including high heat efficiency, which would ensure optimal exploitation and achieve economies of scale; 6) the most part of the recyclable waste is not removed; 7) the infrastructure and mechanism of storage and distribution of energy obtained is not created [2].

In the opinion of many specialists, especially of AVE Ungheni managers, the operation of incineration plants should take place over 10-15 years, when will be provided, after extraction, the majority of the recyclable materials, will be created inter-municipal and interregional landfills, where waste will accumulate, will be clear what is this amount and will be applied the mechanism of storage and distribution of energy obtained. At the same time, the pressing current of waste storage problem in Chisinau requires urgent construction of this plant. Also, only in relation to the incineration plants could be resolved the issue of capacity and location of the other two components of national network of waste management (ramps and transfer station). In the case of the thermal plant operation, will be wasted substantial financial resources from non-functional ramps, and in their absence, ramps built will not cover the many of the localities that have low transport accessibility and the local public administration is not cooperating.

Conclusions

The main current problems of waste management are: spontaneous and illegal dumps; the formal character of granting environmental permits for municipal landfills; nonconformance of many ramps, including authorized, with construction, ecological and sanitary-hygienic rules; presence of many nonfunctional municipal landfills, inefficient administration of ramps and sanitation operations by most public companies. Despite these shortcomings, there has been a considerable reduction, especially in percentage ratio, of the area and the number of unauthorized dumps; the start of regional and zonal projects to implement integrated waste management.

In the Regional Development Strategies are identified priority directions of waste management optimizations, are established the components of national network waste management and their locations. It is necessary the promoting of inter-communal landfills for waste storage and processing, which would meet environmental, economic, financial and technical efficiency criteria, would generate "economies of scale" and reduce areas with greater impact on air, water and soil. Transfer stations should be priority oriented to provide the rural areas, where the selective pre-collection of waste is difficulty and costly. By means of credit, fiscal and trade policy, public authorities should establish mutual relationships between the collection enterprises of recyclable materials and those dealing with the processing and reuse of these waste. There is a need for adequate collaboration and coordination of measures to optimize waste management.

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